

# PATENT ABSTRACTS OF JAPAN

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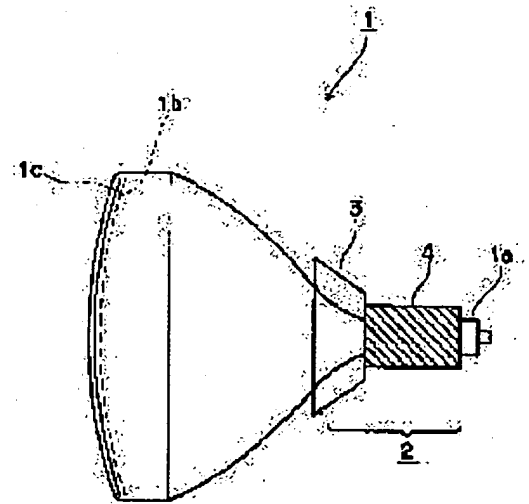
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## (54) CATHODE-RAY TUBE

### (57)Abstract:

**PURPOSE:** To reduce displacement due to the geomagnetism of a cathode-ray tube in a stage before entering a deflection magnetic field and to suppress erroneous landing and erroneous convergence.

**CONSTITUTION:** By mounting a magnetic shield 4 on the neck part 2 of this cathode-ray tube 1, in the stage before an electronic beam emitted from an electron gun enters the deflection magnetic field generated in a deflection yoke 3, influence by the geomagnetism is reduced. Thus, even when the direction of the cathode-ray tube to the geomagnetism is changed, the orbit displacement of the electronic beam is suppressed. Incident position and angle to the deflection magnetic field are the cause of the erroneous landing and the erroneous convergence. Thus, by mounting the magnetic shield 4, the erroneous landing and the erroneous convergence can be suppressed.



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CLAIMS

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[Claim(s)]

[Claim 1] The cathode-ray tube characterized by preparing the magnetic-shielding member which consists of the magnetic substance in the perimeter of the neck section between an electron gun and the deflecting yoke which controls the orbit of the electron beam emitted from this electron gun.

[Claim 2] Said magnetic-shielding member is a cathode-ray tube according to claim 1 characterized by having the cone configuration which made said electron gun side the minor diameter, and made said deflecting yoke side the major diameter.

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## DETAILED DESCRIPTION

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[Detailed Description of the Invention]

[0001]

[Industrial Application] This invention deflects the electron beam emitted from an electron gun, and relates to the cathode-ray tube which reproduces an image to a phosphor screen.

[0002]

[Description of the Prior Art] In a cathode-ray tube, deviate by the deviation field generated with the deflecting yoke, and apply the electron beam emitted from the electron gun to a phosphor screen, it is made to emit light, and an image is reproduced. Especially, it is the structure reproducing a color picture by applying three electron beams emitted from an electron gun in the color picture tube (henceforth the Braun tube) to a predetermined fluorescent substance, and making three colors of red, green, and blue emit light correctly at a certain rate. Unless this work operates normally, on a screen, an irregular color and a color gap arise and a screen is no longer reproduced faithfully.

[0003] For example, under the effect of the assembly error in a production process, and external magnetic fields, such as earth magnetism, the orbit of an electron beam shifts and an irregular color and a color gap arise. With the conventional Braun tube, after the electron beam discharged from the electron gun is deflected in response to the effect of earth magnetism, incidence of it is carried out to the deviation field generated with the deflecting yoke. If the sense of the Braun tube changes at this time when an installation location, the installation direction, etc. change, the effect of earth magnetism to the Braun tube will also change. Therefore, according to change of earth magnetism, the incidence location to the deviation field of an electron beam displaces.

[0004] Consequently, mistake landing and a mistake convergence arise. It says making mistake landing emit light in the fluorescent substance of other colors in the fluorescent substance of a color with which the electron beam emitted from red, green, and the electron gun of three blue corresponds, respectively. Moreover, a mistake convergence means that three above-mentioned electron beams do not concentrate on one point of the stoma (or slit hole) of a shadow mask (or aperture grill).

[0005] Therefore, in order for there to be no color gap and to display the color picture tube finely in all directions, it is necessary to reduce the effect to earth magnetism. So, with the conventional Braun tube, in order to reduce the effect of earth magnetism, the tabular magnetic substance is prepared in the interior of a panel. By attaching this magnetic substance, this magnetic substance works as magnetic shielding, and the variation rate of the electron beam only after deviation field passage is reduced. Consequently, mistake landing and a mistake convergence decrease.

[0006]

[Problem(s) to be Solved by the Invention] By the way, the effect of the earth magnetism in the preceding paragraph story which carries out incidence to magnetic shielding of the conventional picture tube mentioned above to the deviation field of what can reduce the variation rate of the electron beam after the deviation field passage produced with omicron and a deflecting yoke in \*\*\*\* has the fault that it cannot stop. For this reason, when an installation location, the installation direction, etc. change and the sense of the Braun tube changes, there is a problem that mistake landing and a mistake convergence still arise.

[0007] Then, this invention aims at offering the cathode-ray tube which can reduce sharply the mistake landing when changing the sense of a cathode-ray tube to earth magnetism, and a mistake convergence.

[0008]

[Means for Solving the Problem] The cathode-ray tube by invention according to claim 1 is characterized by preparing the magnetic-shielding member which consists of the magnetic substance in the perimeter of the neck section between an electron gun and the deflecting yoke which controls the orbit of the electron beam emitted from this electron gun for the above-mentioned purpose achievement. Moreover, a cathode-ray tube according to claim 2 is characterized by having the cone configuration which said magnetic-shielding member made said electron gun side the minor diameter, and made said deflecting yoke side the major diameter.

[0009]

[Function] In this invention, the effect of earth magnetism is reduced by preparing the magnetic-shielding member which consists of the magnetic substance in the perimeter of the neck section between an electron gun and the deflecting yoke which controls the orbit of the electron beam emitted from this electron gun. Moreover, it is good also as a cone configuration which made the electron gun side the minor diameter for the magnetic-shielding member, and made the deflecting yoke side the major diameter.

[0010]

[Example] Hereafter, this invention is explained based on a drawing. Drawing 1 R> 1 is the side elevation showing the structure of the Braun tube of this invention of this invention. In drawing, 1 is the Braun tube, and it is equipped with color sorting machine style 1b for applying an electron beam only to the fluorescent substance of a predetermined color, and phosphor-screen 1c to which the fluorescent substance of red, green, and blue was applied near the front face inside the Braun tube while it has electron gun 1a which emits an electron beam to the interior of the neck section 2. The Braun tube 1 is made to emit light by applying the electron beam controlled by the primary signal to the fluorescent substance of red, green, and blue, and reproduces a color picture.

[0011] Current and the Braun tube generally used can be divided roughly as follows. First, there are an in-line (level) mold and a delta (trigonum) mold as a classification by the array of an electron gun. In the inline type, each electron gun of red, green, and blue is arranged horizontally, and each electron gun is arranged on the top-most vertices of an equilateral triangle, i.e., the location which shifted 120 degrees at a time, in the delta mold. Next, there are a shadow mask mold and an aperture grill mold as a classification by the color sorting machine style. A shadow mask mold prepares hundreds of thousands of stomata of circular or a rectangle in a thin metal plate. Moreover, an aperture grill mold is replaced with the stoma prepared in the above-mentioned metal plate, and let it be the slit hole of a vertical blind-like grid. 90degree mold, a 110degree mold, 114 degrees, or a 118degree mold is in the last as a classification according to the deflection angle of an electron beam. The thing of which mold mentioned above may be used in this example.

[0012] The deflecting yoke 3 is formed in the neck section 2 of the Braun tube 1. A deflecting yoke 3 deflects the electron beam discharged from electron gun 1a of the neck section 2 by the deviation field which self generated, after passing the stoma (or slit hole) of the electronic screen (a shadow mask, aperture grill) equivalent to color sorting machine style 1b, is made to collide with the fluorescent substance of phosphor-screen 1c, and is made to emit light.

[0013] Moreover, magnetic shielding 4 consists of the magnetic substance, and is a wrap thing from an outside about the perimeter of the neck section 2 in the Braun tube 1. The configuration turns into tubed from the configuration of the neck section 2 fundamentally. Drawing 3 (a) Some of configurations of the above-mentioned magnetic shielding 4 are shown in - (d). Drawing 3 (a) is magnetic-shielding 4a of a cone mold, makes the electron gun 1a side a minor diameter, and makes the deflecting yoke 3 side the major diameter. Next, drawing 3 (b) is telescopic magnetic-shielding 4b which consists of a single diameter, and drawing 3 (c) is magnetic-shielding 4c of the core box which makes a cross-section configuration a rectangle. And drawing 3 (d) is 4d of magnetic shielding telescopic [ double ] which made double structure telescopic [ which is shown in drawing 3 (b) ]. In this example, which magnetic shielding shown in drawing 3 (a) - (d) may be used.

[0014] The amount of the electron beam which the earth magnetism of all directions can weaken and passes the neck section 2 in the neck section 2 with this magnetic shielding 4 deflected by earth magnetism decreases. Consequently, the location which carries out incidence to the deviation field which the electron beam produced with the deflecting yoke, and the variation rate of an include angle decrease. Therefore, the amount of mistake landing and a mistake convergence can be lessened.

[0015] Next, drawing 3 is drawing showing the amount of mistake convergences for explaining the effectiveness of the magnetic shielding 4 in this example. In drawing, the amount of mistake convergences is taken along the axis of ordinate about the case where the magnetic shielding 4 of the configuration shown in drawing 2 (a) - (d) is used, and the case where it does not equip with magnetic shielding of this application. The unit of the amount of mistake convergences is a millimeter. Moreover, as a measuring method, magnetic shielding 4 was attached in the neck section 2, the direction of earth magnetism was changed, and the amount of mistake convergences in four corners was measured after demagnetization with the degaussing system.

[0016] First, in the case of the cone mold and core box to illustrate, the average of four corners was set to 0.10mm, and the worst value was set to 0.11mm. Next, in what piled up telescopic [ with a radius / of 40mm /, and a die length of 50mm ], and a cone mold, it was set to 0.10mm and 0.13mm, respectively. Moreover, in the case of the radius of 40mm, and 50mm die length, in telescopic, the amount of mistake convergences was set to 0.12mm and 0.14mm, and, in the case of the radius of 40mm, and 20mm die length, was set to 0.14mm and 0.16mm, respectively. Furthermore, in the case of the radius of 40mm, and 40mm die length, the amount of mistake convergences was set to 0.15mm and 0.17mm, respectively.

[0017] Next, in the case of the 40x40mm core box, the amount of mistake convergences was set to 0.13mm and 0.18mm, respectively. And in the case of duplex telescopic [ with a radius / of 40mm /, and a radius of 50mm ], the

amount of mistake convergences was set to 0.13mm and 0.19mm, respectively.

[0018] On the other hand, with the Braun tube which has not equipped with the magnetic shielding 4 of this example, the amount of mistake convergences was set to 0.20mm and 0.24mm, respectively.

[0019] Thus, as a result of measuring about various magnetic shielding of the configuration shown in drawing 2 (a) - (d), in the cone mold shown in drawing 2 (a), the amount of mistake convergences became min most, and the effectiveness was accepted. That is, as compared with the case where magnetic shielding is not attached, the amount of mistake convergences was reduced about 55%.

[0020] As mentioned above, in this example, by equipping the neck section 2 of the Braun tube 1 with magnetic shielding 4 shows that the variation rate by the earth magnetism of an electron beam can be reduced in the phase before carrying out incidence to a deviation field.

[0021]

[Effect of the Invention] Since the magnetic-shielding member which consists of the magnetic substance was prepared in the perimeter of the neck section between an electron gun and the deflecting yoke which controls the orbit of the electron beam emitted from this electron gun according to this invention, the advantage that the mistake landing when changing the sense of a cathode-ray tube to earth magnetism and a mistake convergence can be stopped sharply is acquired.

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## DESCRIPTION OF DRAWINGS

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[Brief Description of the Drawings]

[Drawing 1] It is the side elevation showing the appearance structure of the picture tube where magnetic shielding in this invention was attached.

[Drawing 2] It is the perspective view showing the configuration of magnetic shielding in this example.

[Drawing 3] It is drawing showing the amount of mistake convergences for explaining the effectiveness of magnetic shielding in this example.

[Description of Notations]

1 Braun Tube (Cathode-ray Tube)

1a Electron gun

1b Color sorting machine style

1c Phosphor screen

2 Neck Section

3 Deflecting Yoke

4 Magnetic Shielding (Magnetic-Shielding Member)

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